



SEQUENCE LISTING

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<120> NEMATODE-EXTRACTED SERINE PROTEASE INHIBITORS AND ANTICOAGULANT
PROTEIN

<130> 018813/0272487

<140> 09/498,556

<141> 2000-04-02

<150> 08/809,455

<151> 1997-04-17

<150> PCT/US95/13231

<151> 1995-10-17

<150> 08/486,399

<151> 1995-06-05

<150> 08/486,397

<151> 1995-06-05

<150> 08/465,380

<151> 1995-06-05

<150> 08/461,965

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<150> 08/326,110

<151> 1994-10-18

<160> 357

<170> PatentIn version 3.1

<210> 1

<211> 234

<212> DNA

<213> Ancylostoma caninum

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tgcgaggcca agtgcaatga ggaaccccct gaggaggaag atccgatatg ccgctcacgt 120

ggttgtttat tacctcctgc ttgcgtatgc aaagacggat tctacagaga cacggtgatc 180

ggcgactgtg ttagggaaga agaatgcgac caacatgaga ttatacatgt ctga 234

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tgcgaggcca agtgcagtga ggaagaggag gaagatccga tatgccgatc attttcttgt 120

ccgggtcccg ctgcttgctg atgcgaagac ggattctaca gagacacggt gatcggcgac 180

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<210> 3
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<222> (22)..(321)

<220>
<221> MOD_RES
<223> AcaNAPs cDNA sequence

<400> 3

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Met Lys Met Leu Tyr Ala Ile Ala Ile Met
1 5 10

ttt ctc ctg gta tca tta tgc agc gca aga aca gtg agg aag gca tac 99

Phe Leu Leu Val Ser Leu Cys Ser Ala Arg Thr Val Arg Lys Ala Tyr
15 20 25

ccg gag tgt ggt gag aat gaa tgg ctc gac gac tgt gga act cag aag 147

Pro Glu Cys Gly Glu Asn Glu Trp Leu Asp Asp Cys Gly Thr Gln Lys
30 35 40

cca tgc gag gcc aag tgc aat gag gaa ccc cct gag gag gaa gat ccg 195

Pro Cys Glu Ala Lys Cys Asn Glu Glu Pro Pro Glu Glu Glu Asp Pro
45 50 55

ata tgc cgc tca cgt ggt tgt tta tta cct cct gct tgc gta tgc aaa 243

Ile Cys Arg Ser Arg Gly Cys Leu Leu Pro Pro Ala Cys Val Cys Lys
60 65 70

gac gga ttc tac aga gac acg gtg atc ggc gac tgt gtt agg gaa gaa 291

Asp Gly Phe Tyr Arg Asp Thr Val Ile Gly Asp Cys Val Arg Glu Glu
75 80 85 90

gaa tgc gac caa cat gag att ata cat gtc tgaacgagaaa gcaacaataacc 344

Glu Cys Asp Gln His Glu Ile Ile His Val

95 100

aaaggttcca actctcgctc tgcaaaatcg ctagttggat gtctcttttg cgtccgaata 404
gttttagttg atgttaagta agaactcctg ctggagagaa taaagctttc caactcc 461

<210> 4

<211> 77

<212> PRT

<213> Ascyclostoma caninum

<400> 4

Lys Ala Tyr Pro Glu Cys Gly Glu Asn Glu Trp Leu Asp Asp

1 5 10

Cys Gly Thr Gln Lys Pro Cys Glu Ala Lys Cys Asn Glu Glu

15 20 25

Pro Pro Glu Glu Glu Asp Pro Ile Cys Arg Ser Arg Gly Cys

30 35 40

Leu Leu Pro Pro Ala Cys Val Cys Lys Asp Gly Phe Tyr Arg

45 50 55

Asp Thr Val Ile Gly Asp Cys Val Arg Glu Glu Glu Cys Asp

60 65 70

Gln His Glu Ile Ile His Val

75

<210> 5

<211> 455

<212> DNA

<213> Ancylostoma caninum

<220>

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<222> (22)..(315)

<220>

<221> MOD_RES

<223> AcaNAP6 cDNA sequence

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gaattccgct actactcaac a atg aag atg ctt tac gct atc gct ata atg 51

Met Lys Met Leu Tyr Ala Ile Ala Ile Met

1 5 10

ttt ctc ctg gtg tca tta tgc agc aca aga aca gtg agg aag gca tac 99

Phe Leu Leu Val Ser Leu Cys Ser Thr Arg Thr Val Arg Lys Ala Tyr

15 20 25

ccg gag tgt ggt gag aat gaa tgg ctc gac gtc tgt gga act aag aag 147

Pro Glu Cys Gly Glu Asn Glu Trp Leu Asp Val Cys Gly Thr Lys Lys

30 35 40

cca tgc gag gcc aag tgc agt gag gaa gag gag gaa gat ccg ata tgc 195

Pro Cys Glu Ala Lys Cys Ser Glu Glu Glu Glu Asp Pro Ile Cys

45 50 55

cga tca ttt tct tgt ccg ggt ccc gct gct tgc gta tgc gaa gac gga 243

Arg Ser Phe Ser Cys Pro Gly Pro Ala Ala Cys Val Cys Glu Asp Gly
 60 65 70
 ttc tac aga gac acg gtg atc ggc gac tgt gtt aag gaa gaa gaa tgc 291
 Phe Tyr Arg Asp Thr Val Ile Gly Asp Cys Val Lys Glu Glu Glu Cys
 75 80 85 90
 gac caa cat gag att att cat gtc tgaacgagag agcagtaata accaaagggttc 346
 Asp Gln His Glu Ile Ile His Val
 95
 caacttttcgc tctacaaaat cgctagttgg atttctcctt tgcgtgcgaa tagtttttagt 406
 tgatattaag taaaacctcc tgttgaagag aataaagctt toccaacttc 455

<210> 6
 <211> 75
 <212> PRT
 <213> Ascyclostoma caninum

<400> 6

Lys Ala Tyr Pro Glu Cys Gly Glu Asn Glu Trp Leu Asp Val Cys Gly
 1 5 10 15
 Thr Lys Lys Pro Cys Glu Ala Lys Cys Ser Glu Glu Glu Glu Glu Asp
 20 25 30
 Pro Ile Cys Arg Ser Phe Ser Cys Pro Gly Pro Ala Ala Cys Val Cys
 35 40 45
 Glu Asp Gly Phe Tyr Arg Asp Thr Val Ile Gly Asp Cys Val Lys Glu
 50 55 60
 Glu Glu Cys Asp Gln His Glu Ile Ile His Val
 65 70 75

<210> 7
 <211> 81
 <212> PRT
 <213> Ascyclostoma caninum

<400> 7

Arg Thr Val Arg Lys Ala Tyr Pro Glu Cys Gly Glu Asn Glu Trp Leu
 1 5 10 15
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 20 25 30
 Pro Pro Glu Glu Asp Pro Ile Cys Arg Ser Arg Gly Cys Leu Leu
 35 40 45
 Pro Pro Ala Cys Val Cys Lys Asp Gly Phe Tyr Arg Asp Thr Val Ile
 50 55 60
 Gly Asp Cys Val Arg Glu Glu Glu Cys Asp Gln His Glu Ile Ile His
 65 70 75 80
 Val

<210> 8
 <211> 79
 <212> PRT
 <213> Ascyclostoma caninum

<400> 8

Arg Thr Val Arg Lys Ala Tyr Pro Glu Cys Gly Glu Asn Glu Trp Leu
 1 5 10 15
 Asp Val Cys Gly Thr Lys Lys Pro Cys Glu Ala Lys Cys Ser Glu Glu
 20 25 30
 Glu Glu Glu Asp Pro Ile Cys Arg Ser Phe Ser Cys Pro Gly Pro Ala
 35 40 45
 Ala Cys Val Cys Glu Asp Gly Phe Tyr Arg Asp Thr Val Ile Gly Asp
 50 55 60
 Cys Val Lys Glu Glu Glu Cys Asp Gln His Glu Ile Ile His Val
 65 70 75

<210> 9
 <211> 711
 <212> DNA
 <213> Ancylostoma ceylanicum

<220>
 <221> CDS
 <222> (21)..(590)
 <220>
 <221> MOD_RES
 <223> Rcombinant cDNA Molecule AceNAP4 sequence

<400> 9

gaattcacta ttatccaaca atg gcg gtg ctt tat tca gta gca ata gcg 50
 Met Ala Val Leu Tyr Ser Val Ala Ile Ala
 1 5 10
 tta cta ctg gta tca caa tgc agt ggg aaa ccg aac aat gtg atg act 98
 Leu Leu Leu Val Ser Gln Cys Ser Gly Lys Pro Asn Asn Val Met Thr
 15 20 25
 aac gct tgt ggt ctt aat gaa tat ttc gct gag tgt ggc aat atg aag 146
 Asn Ala Cys Gly Leu Asn Glu Tyr Phe Ala Glu Cys Gly Asn Met Lys
 30 35 40
 gaa tgc gag cac aga tgc aat gag gag gaa aat gag gaa agg gac gag 194
 Glu Cys Glu His Arg Cys Asn Glu Glu Glu Asn Glu Glu Arg Asp Glu
 45 50 55
 gaa aga ata acg gca tgc ctc atc cgt gtg tgt ttc cgt cct ggt gct 242
 Glu Arg Ile Thr Ala Cys Leu Ile Arg Val Cys Phe Arg Pro Gly Ala
 60 65 70
 tgc gta tgc aaa gac gga ttc tat aga aac aga aca ggc agc tgt gtg 290
 Cys Val Cys Lys Asp Gly Phe Tyr Arg Asn Arg Thr Gly Ser Cys Val
 75 80 85 90
 gaa gaa gat gac tgc gag tac gag aat atg gag ttc att act ttt gca 338
 Glu Glu Asp Asp Cys Glu Tyr Glu Asn Met Glu Phe Ile Thr Phe Ala
 95 100 105

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cca gaa gta ccg ata tgt ggt tcc aac gaa agg tac tcc gac tgc ggc 386
Pro Glu Val Pro Ile Cys Gly Ser Asn Glu Arg Tyr Ser Asp Cys Gly
      110                      115                      120
aat gac aaa caa tgc gag cgc aaa tgc aac gag gac gat tat gag aag 434
Asn Asp Lys Gln Cys Glu Arg Lys Cys Asn Glu Asp Asp Tyr Glu Lys
      125                      130                      135
gga gat gag gca tgc cgc tca cat gtt tgt gaa cgt cct ggt gcc tgt 482
Gly Asp Glu Ala Cys Arg Ser His Val Cys Glu Arg Pro Gly Ala Cys
      140                      145                      150
gta tgc gaa gac ggg ttc tac aga aac aaa aaa ggt agc tgt gtg gaa 530
Val Cys Glu Asp Gly Phe Tyr Arg Asn Lys Lys Gly Ser Cys Val Glu
      155                      160                      165                      170
agc gat gac tgc gaa tac gat aat atg gat ttc atc act ttt gca cca 578
Ser Asp Asp Cys Glu Tyr Asp Asn Met Asp Phe Ile Thr Phe Ala Pro
      175                      180                      185
gaa acc tca cga taaccaaaga tgctacctct cgtacgcaac tccgctgatt gaggtt 636
Glu Thr Ser Arg
      190
gattcactcc cttgcatctc aacatttttt ttgtgatgct gtgcatctga gcttaacctg 696
ataaagccta tgggtg 711

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<210> 10
<211> 425
<212> DNA
<213> Ancylostoma ceylanicum

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<220>
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<222> (10)..(291)

<220>
<221> MOD_RES
<223> Recombinant cDNA Molecule AceNAP5 sequence

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<400> 10

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gaattccgc atg cgg acg ctc tac ctc att tct atc tgg ttg ttc ctc atc 51
      Met Arg Thr Leu Tyr Leu Ile Ser Ile Trp Leu Phe Leu Ile
      1          5          10
tcg caa tgt aat gga aaa gca ttc ccg aaa tgt gac gtc aat gaa aga 99
Ser Gln Cys Asn Gly Lys Ala Phe Pro Lys Cys Asp Val Asn Glu Arg
      15          20          25          30
ttc gag gtg tgt ggc aat ctg aag gag tgc gag ctc aag tgc gat gag 147
Phe Glu Val Cys Gly Asn Leu Lys Glu Cys Glu Leu Lys Cys Asp Glu
      35          40          45
gac cct aag ata tgc tct cgt gca tgt att cgt ccc cct gct tgc gta 195
Asp Pro Lys Ile Cys Ser Arg Ala Cys Ile Arg Pro Pro Ala Cys Val
      50          55          60
tgc gat gac gga ttc tac aga gac aaa tat ggc ttc tgt gtt gaa gaa 243
Cys Asp Asp Gly Phe Tyr Arg Asp Lys Tyr Gly Phe Cys Val Glu Glu
      65          70          75

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gac gaa tgt aac gat atg gag att att act ttt cca cca gaa acc aaa tg 293
 Asp Glu Cys Asn Asp Met Glu Ile Ile Thr Phe Pro Pro Glu Thr Lys
 80 85 90
 atgaccgaag cttccacctt tctatacata tcttcaactgc ttgacagggt tctcgacaat 353
 ttagaagttc tgcttgactt tgtctatttg aaattgttca cactaatggg ggaagtaaag 413
 cattttcacg ac 425

<210> 11
 <211> 471
 <212> DNA
 <213> Ancylostoma ceylanicum

<220>
 <221> CDS
 <222> (23)..(237)
 <220>
 <221> MOD_RES
 <223> Recombinant cDNA Molecule AceNAP7 sequence

<400> 11

gaattccgct acattttcaa ca atg tcg acg ctt tat gtt atc gca ata tgt 52
 Met Ser Thr Leu Tyr Val Ile Ala Ile Cys
 1 5 10
 ttg ctg ctt gtt tcg caa tgc aat gga aga acg gtg aag aag tgt ggc 100
 Leu Leu Leu Val Ser Gln Cys Asn Gly Arg Thr Val Lys Lys Cys Gly
 15 20 25
 aag aat gaa aga tac gac gac tgt ggc aat gca aag gac tgc gag acc 148
 Lys Asn Glu Arg Tyr Asp Asp Cys Gly Asn Ala Lys Asp Cys Glu Thr
 30 35 40
 aag tgc ggt gaa gag gaa aag gtg tgc cgt tcg cgt gag tgt act agt 196
 Lys Cys Gly Glu Glu Glu Lys Val Cys Arg Ser Arg Glu Cys Thr Ser
 45 50 55
 cct ggt gcc tgc gta tgc gaa caa gga ttc tac aga gat ccg gct ggc 244
 Pro Gly Ala Cys Val Cys Glu Gln Gly Phe Tyr Arg Asp Pro Ala Gly
 60 65 70
 gac tgt gtc act gat gaa gaa tgt gat gaa tgg aac aat atg gag atc 292
 Asp Cys Val Thr Asp Glu Glu Cys Asp Glu Trp Asn Asn Met Glu Ile
 75 80 85 90
 att act atg cca aaa cag tagtgogaag ttcccttctt tctccaaatc tgctccgtg 349
 Ile Thr Met Pro Lys Gln
 95
 ctcaattatc acacacctcc actagttaag attgactgac tctcttgcac tgtagtattt 409
 tcgcttgact ctgtgcattt aagcatgaga tactactagg gagaataaaa attactaact 469
 ac 471

<210> 12
 <211> 396
 <212> DNA
 <213> Ancylostoma duodenale

<220>
 <221> CDS
 <222> (10)..(237)

<220>
 <221> MOD_RES
 <223> Recombinant cDNA Molecule AduNAP4 sequence

<400> 12

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gaattccgg aaa tgt cct acc gat gaa tgg ttc gat tgg tgt gga act tac    51
      Lys Cys Pro Thr Asp Glu Trp Phe Asp Trp Cys Gly Thr Tyr
      1              5              10
aag cat tgc gaa ctc aag tgc gat agg gag cta act gag aaa gaa gag    99
Lys His Cys Glu Leu Lys Cys Asp Arg Glu Leu Thr Glu Lys Glu Glu
15              20              25              30
cag gca tgt ctc tca cgt gtt tgt gag aag tcc gct tgc gta tgc aat    147
Gln Ala Cys Leu Ser Arg Val Cys Glu Lys Ser Ala Cys Val Cys Asn
              35              40              45
gac gga tta tac aga gac aag ttt ggc aac tgt gtt gaa aaa gac gaa    195
Asp Gly Leu Tyr Arg Asp Lys Phe Gly Asn Cys Val Glu Lys Asp Glu
              50              55              60
tgc aac gat atg gag att att act ttt gca cca gaa acc aaa taatggccta  247
Cys Asn Asp Met Glu Ile Ile Thr Phe Ala Pro Glu Thr Lys
              65              70              75
aggttccaaa ccttgctaca cacgcgtcagt gctttactgt ttcctctacg tgtagtagt    307
tttgcttgac tctgtgtatt taagcattgt ctactaatgg gcaaagtaaa gcattgtaag    367
gacataataa tgagtaaacc ttctgattt                                     396
  
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<210> 13
 <211> 688
 <212> DNA
 <213> Ancylostoma ceylanicum

<220>
 <221> CDS
 <222> (21) .. (560)

<220>
 <221> MOD_RES
 <223> Recombinant cDNA Molecule AduNAP7 sequence

<400> 13

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                        Met Arg Met Leu Tyr Leu Val Pro Ile Trp
                        1         5         10
ttg ctg ctc att tcg cta tgc agt gga aaa gct gcg aag aaa tgt ggt      98
Leu Leu Leu Ile Ser Leu Cys Ser Gly Lys Ala Ala Lys Lys Cys Gly
                        15         20         25
ctc aat gaa agg ctg gac tgt ggc aat ctg aag caa tgc gag ccc aag      146
Leu Asn Glu Arg Leu Asp Cys Gly Asn Leu Lys Gln Cys Glu Pro Lys
                        30         35         40
tgc agc gac ttg gaa agt gag gag tat gag gag gaa gat gag tcg aaa      194
Cys Ser Asp Leu Glu Ser Glu Glu Tyr Glu Glu Glu Asp Glu Ser Lys
                        45         50         55
tgt cga tca cgt gaa tgt tct cgt cgt gtt tgt gta tgc gat gaa gga      242
Cys Arg Ser Arg Glu Cys Ser Arg Arg Val Cys Val Cys Asp Glu Gly
                        60         65         70
ttc tac aga aac aag aag ggc aag tgt gtt gca aaa gat gtt tgc gag      290
Phe Tyr Arg Asn Lys Lys Gly Lys Cys Val Ala Lys Asp Val Cys Glu
                        75         80         85         90
gac gac aat atg gag att atc act ttt cca cca gaa gac gaa tgt ggt      338
Asp Asp Asn Met Glu Ile Ile Thr Phe Pro Pro Glu Asp Glu Cys Gly
                        95         100        105
ccc gat gaa tgg ttc gac tac tgt gga aat tat aag aag tgc gaa cgc      386
Pro Asp Glu Trp Phe Asp Tyr Cys Gly Asn Tyr Lys Lys Cys Glu Arg
                        110        115        120
aag tgc agt gag gag aca agt gag aaa aat gag gag gca tgc ctc tct      434
Lys Cys Ser Glu Glu Thr Ser Glu Lys Asn Glu Glu Ala Cys Leu Ser
                        125        130        135
cgt gct tgt act ggt cgt gct tgc gta tgc aaa gac gga ttg tac aga      482
Arg Ala Cys Thr Gly Arg Ala Cys Val Cys Lys Asp Gly Leu Tyr Arg
                        140        145        150
gac gac ttt ggc aac tgt gtt cca cat gac gaa tgc aac gat atg gag      530
Asp Asp Phe Gly Asn Cys Val Pro His Asp Glu Cys Asn Asp Met Glu
                        155        160        165        170
atc atc act ttt cca ccg gaa acc aaa cat tgaccagagg ctccaactct cgct      584
Ile Ile Thr Phe Pro Pro Glu Thr Lys His
                        175        180
acacaacgtc agggctagaa tggccccctct gcgagttagt agttttgctt gactctgctt      644
atttgagcac tttctattga tggcgaaaat aaagcattta aaac                        688

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<210> 14
 <211> 349
 <212> DNA
 <213> Heligmosomoides polygyrus

<220>
 <221> CDS
 <222> (49)..(276)

<220>
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 <223> Recombinant cDNA Molecule HpoNAP5 sequence

<400> 14

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gaattccgcg cacctgagag gtgagctacg caagtcttcg ctggtaca atg atc cga      57
                                     Met Ile Arg
                                     1
aag ctc gtt ctg ctg act gct atc gtc acg gtg gtg cta agt gcg aag      105
Lys Leu Val Leu Leu Thr Ala Ile Val Thr Val Val Leu Ser Ala Lys
   5                10                15
acc tgt gga cca aac gag gag tac act gaa tgc ggg acg cca tgc gag      153
Thr Cys Gly Pro Asn Glu Glu Tyr Thr Glu Cys Gly Thr Pro Cys Glu
  20                25                30                35
ccg aag tgc aat gaa ccg atg cca gac atc tgt act ctg aac tgc atc      201
Pro Lys Cys Asn Glu Pro Met Pro Asp Ile Cys Thr Leu Asn Cys Ile
               40                45                50
gtg aac gtg tgt cag tgc aaa ccc ggc ttc aag cgc gga ccg aaa gga      249
Val Asn Val Cys Gln Cys Lys Pro Gly Phe Lys Arg Gly Pro Lys Gly
           55                60                65
tgc gtc gcc ccc gga cca ggc tgt aaa tagttctcca cctgcccttt cgttggaa 304
Cys Val Ala Pro Gly Pro Gly Cys Lys
   70                75
caaatggctg tctttttaca ttctgaatca ataaagccga acggt      349

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<220>
<221> MOD_RES
<223> pDONG61 vector sequence
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70036663v1

<210> 16
 <211> 433
 <212> DNA
 <213> Heligmosomoides polygyrus

<220>
 <221> CDS
 <222> (40)..(393)

<220>
 <221> MOD_RES
 <223> pDONG62 vector sequence

<400> 16

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aagctttgct aacatactgc gtaataagga gtcttaatc atg cca gtt ctt ttg      54
                                     Met Pro Val Leu Leu
                                     1         5
ggt att ccg tta tta ttg cgt ttc ctc ggt ttc ctt ctg gta act ttg      102
Gly Ile Pro Leu Leu Leu Arg Phe Leu Gly Phe Leu Leu Val Thr Leu
                                     10         15         20
ttc ggc tat ctg ctt act ttc ctt aaa aag ggc ttc ggt aag ata gct      150
Phe Gly Tyr Leu Leu Thr Phe Leu Lys Lys Gly Phe Gly Lys Ile Ala
                                     25         30         35
att gct att tca ttg ttt ctt gct ctt att att ggg ctt aac tca att      198
Ile Ala Ile Ser Leu Phe Leu Ala Leu Ile Ile Gly Leu Asn Ser Ile
                                     40         45         50
ctt gtg ggt tat ctc tct gat att agc gca caa tta ccc tct gat ttt      246
Leu Val Gly Tyr Leu Ser Asp Ile Ser Ala Gln Leu Pro Ser Asp Phe
                                     55         60         65
ggt cag ggc gtt cag tta att ctc ccg tct aat gcg ctt ccc tgt ttt      294
Val Gln Gly Val Gln Leu Ile Leu Pro Ser Asn Ala Leu Pro Cys Phe
                                     70         75         80         85
tat gtt att ctc tct gta aag gct gct att ttc att ttt gac gtt aaa      342
Tyr Val Ile Leu Ser Val Lys Ala Ala Ile Phe Ile Phe Asp Val Lys
                                     90         95         100
caa aaa atc gtt tct tat ttg gat tgg gat aaa ggt gga ggc tca ggc      390
Gln Lys Ile Val Ser Tyr Leu Asp Trp Asp Lys Gly Gly Gly Ser Gly
                                     105         110         115
gga gggccaagtc ggccatccca tatcacgcgg ccgcggatcc      433
Gly

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<210> 17
 <211> 434
 <212> DNA
 <213> Heligmosomoides polygyrus

<220>
 <221> CDS
 <222> (140)..(291)

<220>
 <221> MOD_RES
 <223> pDONG63 vector sequence

<400> 17

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aagctttgct aacatactgc gtaataagga gtcttaatc atg cca gtt ctt ttg      54
                                     Met Pro Val Leu Leu
                                     1           5
ggt att ccg tta tta ttg cgt ttc ctc ggt ttc ctt ctg gta act ttg      102
Gly Ile Pro Leu Leu Leu Arg Phe Leu Gly Phe Leu Leu Val Thr Leu
                                     10           15           20
ttc ggc tat ctg ctt act ttc ctt aaa aag ggc ttc ggt aag ata gct      150
Phe Gly Tyr Leu Leu Thr Phe Leu Lys Lys Gly Phe Gly Lys Ile Ala
                                     25           30           35
att gct att tca ttg ttt ctt gct ctt att att ggg ctt aac tca att      198
Ile Ala Ile Ser Leu Phe Leu Ala Leu Ile Ile Gly Leu Asn Ser Ile
                                     40           45           50
ctt gtg ggt tat ctc tct gat att agc gca caa tta ccc tct gat ttt      246
Leu Val Gly Tyr Leu Ser Asp Ile Ser Ala Gln Leu Pro Ser Asp Phe
                                     55           60           65
gtt cag ggc gtt cag tta att ctc ccg tct aat gcg ctt ccc tgt ttt      294
Val Gln Gly Val Gln Leu Ile Leu Pro Ser Asn Ala Leu Pro Cys Phe
70           75           80           85
tat gtt att ctc tct gta aag gct gct att ttc att ttt gac gtt aaa      342
Tyr Val Ile Leu Ser Val Lys Ala Ala Ile Phe Ile Phe Asp Val Lys
90           95           100
caa aaa atc gtt tct tat ttg gat tgg gat aaa ggt gga ggc tca ggc      390
Gln Lys Ile Val Ser Tyr Leu Asp Trp Asp Lys Gly Gly Gly Ser Gly
105           110           115
gga tcggccaagt cggccatccc atatcacgcg gccgcggatc c      434
Gly

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<210> 18
 <211> 6
 <212> PRT
 <213> Artificial Sequence

<220>
 <221> misc_feature
 <223> Description of Artificial Sequence: pDONG vector linker sequence

<400> 18

Gly Gly Gly Ser Gly Gly
 1 5

<210> 19
 <211> 430
 <212> DNA
 <213> Ancylostoma ceylanicum

<220>
 <221> CDS
 <222> (10)..(282)

<220>
 <221> MOD_RES
 <223> "w" stands for a or t

<400> 19

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gaattccgg ctg gtw tcc tac tgc agt gga aaa gca acg atg cag tgt ggt 51
      Leu Val Ser Tyr Cys Ser Gly Lys Ala Thr Met Gln Cys Gly
      1          5          10
gag aat gaa aag tac gat tgc tgc ggt agc aag gag tgc gat aag aag 99
Glu Asn Glu Lys Tyr Asp Ser Cys Gly Ser Lys Glu Cys Asp Lys Lys
15          20          25          30
tgc aaa tat gac gga gtt gag gag gaa gac gac gag gaa cct aat gtg 147
Cys Lys Tyr Asp Gly Val Glu Glu Glu Asp Asp Glu Glu Pro Asn Val
      35          40          45
cca tgc cta gta cgt gtg tgt cat caa gat tgc gta tgc gaa gaa gga 195
Pro Cys Leu Val Arg Val Cys His Gln Asp Cys Val Cys Glu Glu Gly
      50          55          60
ttc tat aga aac aaa gat gac aaa tgt gta tca gca gaa gag tgc gaa 243
Phe Tyr Arg Asn Lys Asp Asp Lys Cys Val Ser Ala Glu Asp Cys Glu
      65          70          75
ctt gac aat atg gac ttt ata tat ccc gga act cga aac tgaacgaaggctc 295
Leu Asp Asn Met Asp Phe Ile Tyr Pro Gly Thr Arg Asn
      80          85          90
cattcttgcg gcacaagatc gattgtctct cccctgcacg tcagtagttt tgctacattg 355

tatatggtag caaaaaatta gcttagggag aataaaatct ttacctatat ttaatcaatg 415

aagtattctc tttct 430

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<210> 20
 <211> 100
 <212> PRT
 <213> Ancylostoma caninum

<400> 20

Met	Lys	Met	Leu	Tyr	Ala	Ile	Ala	Ile	Met	Phe	Leu	Leu	Val	Ser	Leu
1				5					10					15	
Cys	Ser	Ala	Arg	Thr	Val	Arg	Lys	Ala	Tyr	Pro	Glu	Cys	Gly	Glu	Asn
			20					25					30		
Glu	Trp	Leu	Asp	Asp	Cys	Gly	Thr	Gln	Lys	Pro	Cys	Glu	Ala	Lys	Cys
		35					40					45			
Asn	Glu	Glu	Pro	Pro	Glu	Glu	Glu	Asp	Pro	Ile	Cys	Arg	Ser	Arg	Gly
	50					55					60				
Cys	Leu	Leu	Pro	Pro	Ala	Cys	Val	Cys	Lys	Asp	Gly	Phe	Tyr	Arg	Asp
65					70					75				80	
Thr	Val	Ile	Gly	Asp	Cys	Val	Arg	Glu	Glu	Glu	Cys	Asp	Gln	His	Glu
				85					90					95	
Ile	Ile	His	Val												
			100												

<210> 21
 <211> 98
 <212> PRT
 <213> Ancylostoma caninum

<400> 21

Met	Lys	Met	Leu	Tyr	Ala	Ile	Ala	Ile	Met	Phe	Leu	Leu	Val	Ser	Leu
1				5					10					15	
Cys	Ser	Thr	Arg	Thr	Val	Arg	Lys	Ala	Tyr	Pro	Glu	Cys	Gly	Glu	Asn
			20					25					30		
Glu	Trp	Leu	Asp	Val	Cys	Gly	Thr	Lys	Lys	Pro	Cys	Glu	Ala	Lys	Cys
		35					40					45			
Ser	Glu	Glu	Glu	Glu	Glu	Asp	Pro	Ile	Cys	Arg	Ser	Phe	Ser	Cys	Pro
	50					55				60					
Gly	Pro	Ala	Ala	Cys	Val	Cys	Glu	Asp	Gly	Phe	Tyr	Arg	Asp	Thr	Val
65					70					75				80	
Ile	Gly	Asp	Cys	Val	Lys	Glu	Glu	Glu	Cys	Asp	Gln	His	Glu	Ile	Ile
				85					90					95	
His	Val														

<210> 22
 <211> 94
 <212> PRT
 <213> Ancylostoma ceylanicum

<400> 22

Met	Arg	Thr	Leu	Tyr	Leu	Ile	Ser	Ile	Trp	Leu	Phe	Leu	Ile	Ser	Gln
1				5					10					15	
Cys	Asn	Gly	Lys	Ala	Phe	Pro	Lys	Cys	Asp	Val	Asn	Glu	Arg	Phe	Glu
			20					25					30		
Val	Cys	Gly	Asn	Leu	Lys	Glu	Cys	Glu	Leu	Lys	Cys	Asp	Glu	Asp	Pro
		35					40					45			
Lys	Ile	Cys	Ser	Arg	Ala	Cys	Ile	Arg	Pro	Pro	Ala	Cys	Val	Cys	Asp
	50					55					60				
Asp	Gly	Phe	Tyr	Arg	Asp	Lys	Tyr	Gly	Phe	Cys	Val	Glu	Glu	Asp	Glu
65				70						75					80
Cys	Asn	Asp	Met	Glu	Ile	Ile	Thr	Phe	Pro	Pro	Glu	Thr	Lys		
				85					90						

<210> 23
 <211> 96
 <212> PRT
 <213> Ancylostoma ceylanicum

<400> 23

Met	Ser	Thr	Leu	Tyr	Val	Ile	Ala	Ile	Cys	Leu	Leu	Leu	Val	Ser	Gln
1				5					10					15	
Cys	Asn	Gly	Arg	Thr	Val	Lys	Lys	Cys	Gly	Lys	Asn	Glu	Arg	Tyr	Asp
			20					25					30		
Asp	Cys	Gly	Asn	Ala	Lys	Asp	Cys	Glu	Thr	Lys	Cys	Gly	Glu	Glu	Glu
		35					40					45			
Lys	Val	Cys	Arg	Ser	Arg	Glu	Cys	Thr	Ser	Pro	Gly	Ala	Cys	Val	Cys
	50					55					60				
Glu	Gln	Gly	Phe	Tyr	Arg	Asp	Pro	Ala	Gly	Asp	Cys	Val	Thr	Asp	Glu
65				70						75					80
Glu	Cys	Asp	Glu	Trp	Asn	Asn	Met	Glu	Ile	Ile	Thr	Met	Pro	Lys	Gln
				85					90					95	

<210> 24
 <211> 108
 <212> PRT
 <213> Ancylostoma ceylanicum

<400> 24

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Met Ala Val Leu Tyr Ser Val Ala Ile Ala Leu Leu Leu Val Ser Gln
 1           5           10           15
Cys Ser Gly Lys Pro Asn Asn Val Met Thr Asn Ala Cys Gly Leu Asn
      20           25           30
Glu Tyr Phe Ala Glu Cys Gly Asn Met Lys Glu Cys Glu His Arg Cys
      35           40           45
Asn Glu Glu Glu Asn Glu Glu Arg Asp Glu Glu Arg Ile Thr Ala Cys
      50           55           60
Leu Ile Arg Val Cys Phe Arg Pro Gly Ala Cys Val Cys Lys Asp Gly
      65           70           75           80
Phe Tyr Arg Asn Arg Thr Gly Ser Cys Val Glu Glu Asp Asp Cys Glu
      85           90           95
Tyr Glu Asn Met Glu Phe Ile Thr Phe Ala Pro Glu
      100           105

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<210> 25
 <211> 82
 <212> PRT
 <213> Ancylostoma ceylanicum

<400> 25

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Val Pro Ile Cys Gly Ser Asn Glu Arg Tyr Ser Asp Cys Gly Asn Asp
 1           5           10           15
Lys Gln Cys Glu Arg Lys Cys Asn Glu Asp Asp Tyr Glu Lys Gly Asp
      20           25           30
Glu Ala Cys Arg Ser His Val Cys Glu Arg Pro Gly Ala Cys Val Cys
      35           40           45
Glu Asp Gly Phe Tyr Arg Asn Lys Lys Gly Ser Cys Val Glu Ser Asp
      50           55           60
Asp Cys Glu Tyr Asp Asn Met Asp Phe Ile Thr Phe Ala Pro Glu Thr
      65           70           75           80
Ser Arg

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<210> 26
 <211> 75
 <212> PRT
 <213> Ancylostoma duodenale

<400> 26

Lys	Cys	Pro	Thr	Asp	Glu	Trp	Phe	Asp	Trp	Cys	Gly	Thr	Tyr	Lys	His
1				5					10					15	
Cys	Glu	Leu	Lys	Cys	Asp	Arg	Glu	Leu	Thr	Glu	Glu	Glu	Gln	Ala	Cys
			20					25					30		
Leu	Ser	Arg	Val	Cys	Glu	Lys	Ser	Ala	Cys	Val	Cys	Asn	Asp	Gly	Leu
		35					40					45			
Tyr	Arg	Asp	Lys	Phe	Gly	Asn	Cys	Val	Glu	Lys	Asp	Glu	Cys	Asn	Asp
	50					55					60				
Met	Glu	Ile	Ile	Thr	Phe	Ala	Pro	Glu	Thr	Lys					
65					70					75					

<210> 27
 <211> 102
 <212> PRT
 <213> Ancylostoma duodenale

<400> 27

Met	Arg	Met	Leu	Tyr	Leu	Val	Pro	Ile	Trp	Leu	Leu	Leu	Ile	Ser	Leu
1				5					10					15	
Cys	Ser	Gly	Lys	Ala	Ala	Lys	Lys	Cys	Gly	Leu	Asn	Glu	Arg	Leu	Asp
			20					25					30		
Cys	Gly	Asn	Leu	Lys	Gln	Cys	Glu	Pro	Lys	Cys	Ser	Asp	Leu	Glu	Ser
		35					40					45			
Glu	Glu	Tyr	Glu	Glu	Glu	Asp	Glu	Ser	Lys	Cys	Arg	Ser	Arg	Glu	Cys
	50					55					60				
Ser	Arg	Arg	Val	Cys	Val	Cys	Asp	Glu	Gly	Phe	Tyr	Arg	Asn	Lys	Lys
65					70					75				80	
Gly	Lys	Cys	Val	Ala	Lys	Asp	Val	Cys	Glu	Asp	Asp	Asn	Met	Glu	Ile
			85						90					95	
Ile	Thr	Phe	Pro	Pro	Glu										
					100										

<210> 28
 <211> 78
 <212> PRT
 <213> Ancylostoma duodenale

<400> 28

Asp	Glu	Cys	Gly	Pro	Asp	Glu	Trp	Phe	Asp	Tyr	Cys	Gly	Asn	Tyr	Lys
1				5				10					15		
Lys	Cys	Glu	Arg	Lys	Cys	Ser	Glu	Glu	Thr	Ser	Glu	Lys	Asn	Glu	Glu
			20					25					30		
Ala	Cys	Leu	Ser	Arg	Ala	Cys	Thr	Gly	Arg	Ala	Cys	Val	Cys	Lys	Asp
		35					40					45			
Gly	Leu	Tyr	Arg	Asp	Asp	Phe	Gly	Asn	Cys	Val	Pro	His	Asp	Glu	Cys
	50				55					60					
Asn	Asp	Met	Glu	Ile	Ile	Thr	Phe	Pro	Pro	Glu	Thr	Lys	His		
65				70				75							

<210> 29
 <211> 76
 <212> PRT
 <213> Helogmosomoides polygyrus

<400> 29

Met	Ile	Arg	Lys	Leu	Val	Leu	Leu	Thr	Ala	Ile	Val	Thr	Val	Val	Leu
1				5				10					15		
Ser	Ala	Lys	Thr	Cys	Gly	Pro	Asn	Glu	Tyr	Thr	Glu	Cys	Gly	Thr	
			20					25				30			
Pro	Cys	Glu	Pro	Lys	Cys	Asn	Glu	Pro	Met	Pro	Asp	Ile	Cys	Thr	Leu
		35					40				45				
Asn	Cys	Ile	Val	Asn	Val	Cys	Gln	Cys	Lys	Pro	Gly	Phe	Lys	Arg	Gly
	50				55					60					
Pro	Lys	Gly	Cys	Val	Ala	Pro	Gly	Pro	Gly	Cys	Lys				
65				70				75							

<210> 30
 <211> 187
 <212> DNA
 <213> Ancylostoma caninum

<400> 30

ttattcgaaa cgatgttctc tccaattttg tccttgga aa ttatttttagc tactttgcaa 60
 tctgtcttcg cccagccagt tatctccact accgttggtt ccgctgccga gggttctttg 120
 gacaagaggg cstatccgagg aattcagatc tgaatgcggc cgctcgagac tagtggatcc 180
 ttagaca 187

<210> 31
 <211> 495
 <212> DNA
 <213> Ancylostoma caninum

<220>
 <221> CDS
 <222> (36)..(356)

<220>
 <221> MOD_RES
 <223> Recombinant cDNA Molecule AcaNAP23 sequence

<400> 31

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gaattccgcg gaattccgct tgctactact caacg atg aag acg ctc tat att      53
                               Met Lys Thr Leu Tyr Ile
                               1           5
gtc gct ata tgc tcg ctc ctc att tcg ctg tgt act gga aaa cct tcg      101
Val Ala Ile Cys Ser Leu Leu Ile Ser Leu Cys Thr Gly Lys Pro Ser
          10           15           20
gag aaa gaa tgt ggt ccc cat gaa aga ctc gac tgt ggc aac aag aag      149
Glu Lys Glu Cys Gly Pro His Glu Arg Leu Asp Cys Gly Asn Lys Lys
          25           30           35
cca tgc gag cgc aag tgc aaa ata gag aca agt gag gag gag gat gac      197
Pro Cys Glu Arg Lys Cys Lys Ile Glu Thr Ser Glu Glu Glu Asp Asp
          40           45           50
tac gaa gag gga acc gaa cgt ttt cga tgc ctc tta cgt gtg tgt gat      245
Tyr Glu Glu Gly Thr Glu Arg Phe Arg Cys Leu Leu Arg Val Cys Asp
          55           60           65           70
cag cct tat gaa tgc ata tgc gat gat gga tac tac aga aac aag aaa      293
Gln Pro Tyr Glu Cys Ile Cys Asp Asp Gly Tyr Tyr Arg Asn Lys Lys
          75           80           85
ggc gaa tgt gtg act gat gat gta tgc cag gaa gac ttt atg gag ttt      341
Gly Glu Cys Val Thr Asp Asp Val Cys Gln Glu Asp Phe Met Glu Phe
          90           95           100
att act ttc gca cca taaacccaat aatgaccaat gactcccatt cttcgtgatcag 398
Ile Thr Phe Ala Pro
          105

cgtcggtggt tgacagtctc ccctacatct tagtagtttt gcttgataat gtatacataa 458

actgtacttt ctgagataga ataaagctct caactac                                495

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<210> 32
 <211> 478
 <212> DNA
 <213> Ancylostoma caninum

<220>
 <221> CDS
 <222> (24)..(341)

<220>
 <221> MOD_RES
 <223> Recombinant cDNA Molecule AcaNAP24 sequence

<400> 32

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gaattccgcg gaattccgca acg atg aag acg ctc tat att atc gct ata tgc 53
                        Met Lys Thr Leu Tyr Ile Ile Ala Ile Cys
                        1           5           10
tcg ctc ctc att tcg ttg tgt act gga aga ccg gaa aaa aag tgc ggt 101
Ser Leu Leu Ile Ser Leu Cys Thr Gly Arg Pro Glu Lys Lys Cys Gly
                        15           20           25
ccc ggt gaa aga ctc gcc tgt ggc aat aag aag cca tgc gag cgc aag 149
Pro Gly Glu Arg Leu Ala Cys Gly Asn Lys Lys Pro Cys Glu Arg Lys
                        30           35           40
tgc aaa ata gag aca agt gag gag gag gat gac tac cca gag gga acc 197
Cys Lys Ile Glu Thr Ser Glu Glu Glu Asp Asp Tyr Pro Glu Gly Thr
                        45           50           55
gaa cgt ttt cga tgc ctc tta cgt gtg tgt gat cag cct tat gaa tgc 245
Glu Arg Phe Arg Cys Leu Leu Arg Val Cys Asp Gln Pro Tyr Glu Cys
                        60           65           70
ata tgc gat gat gga tac tac aga aac aag aaa ggc gaa tgt gtg act 293
Ile Cys Asp Asp Gly Tyr Tyr Arg Asn Lys Lys Gly Glu Cys Val Thr
                        75           80           85           90
gat gat gta tgc cag gaa gac ttt atg gag ttt att act ttc gca cca 341
Asp Asp Val Cys Gln Glu Asp Phe Met Glu Phe Ile Thr Phe Ala Pro
                        95           100          105
taaaccaat aatgaccact ggctccatt ctctgtgacc agcgtcgggtg gttgacagtc 401

tcccctgcat cttagtagtt ttgcttgata atgtatccat aaacagtact ttctgagata 461

gaataaaagct ctcaact 478

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<210> 33
 <211> 472
 <212> DNA
 <213> Ancylostoma caninum

<220>
 <221> CDS
 <222> (21)..(335)

<220>
 <221> MOD_RES
 <223> Recombinant cDNA Molecule AcaNAP25 sequence

<400> 33

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gaattccgta ctactcaacg atg aag acg ctc tat att atc gct ata tgc      50
                        Met Lys Thr Leu Tyr Ile Ile Ala Ile Cys
                        1           5           10
tcg ctg ctc ttt tca ctg tgt act gga aga ccg gaa aaa aag tgc ggt      98
Ser Leu Leu Phe Ser Leu Cys Thr Gly Arg Pro Glu Lys Lys Cys Gly
                        15           20           25
ccc ggt gaa aga ctc gac tgt gcc aac aag aag cca tgc gag ccc aag      146
Pro Gly Glu Arg Leu Asp Cys Ala Asn Lys Lys Pro Cys Glu Pro Lys
                        30           35           40
tgc aaa ata gag aca agt gag gag gag gat gac gac gta gag gat acc      194
Cys Lys Ile Glu Thr Ser Glu Glu Glu Asp Asp Asp Val Glu Asp Thr
                        45           50           55
gat gtg aga tgc ctc gta cgt gtg tgt gaa cgt cct ctt aaa tgc ata      242
Asp Val Arg Cys Leu Val Arg Val Cys Glu Arg Pro Leu Lys Cys Ile
                        60           65           70
tgc aag gat gga tac tac aga aac aag aaa ggc gaa tgt gtg act gat      290
Cys Lys Asp Gly Tyr Tyr Arg Asn Lys Lys Gly Glu Cys Val Thr Asp
                        75           80           85           90
gat gta tgc cag gaa gac ttt atg gag ttt att act ttc gca cca taaacc 341
Asp Val Cys Gln Glu Asp Phe Met Glu Phe Ile Thr Phe Ala Pro
                        95           100          105
caataatgac cactggctcc cattcttcgt gatcagcgtc ggtgggtgac agtctccct 401

gcattcttagt tgctttgctt gataatctat acataaacag tactttctga gatagaataa 461

agctctcaac t                                                              472

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<210> 34
<211> 487
<212> DNA
<213> Ancylostoma caninum

<220>
<221> CDS
<222> (57)..(347)

<220>
<221> MOD_RES
<223> Recombinant cDNA Molecule AcaNAP31, AcaNAP42 and AcaNAP46 sequence

<400> 34

gaattccgga cttactagta ctcagcgaat caaatacgac ttactactac tcaacg atg 59
                                         Met
                                         1
aag acg ctc tct gct atc cct ata atg ctg ctc ctg gta tcg caa tgc 107
Lys Thr Leu Ser Ala Ile Pro Ile Met Leu Leu Leu Val Ser Gln Cys
      5              10              15
agt gga aaa tca ctg tgg gat cag aag tgt ggt gag aat gaa agg ctc 155
Ser Gly Lys Ser Leu Trp Asp Gln Lys Cys Gly Glu Asn Glu Arg Leu
      20              25              30
gac tgt ggc aat cag aag gac tgt gag cgc aag tgc gat gat aaa aga 203
Asp Cys Gly Asn Gln Lys Asp Cys Glu Arg Lys Cys Asp Asp Lys Arg
      35              40              45
agt gaa gaa gaa att atg cag gca tgt ctc aca cgt caa tgt ctt cct 251
Ser Glu Glu Glu Ile Met Gln Ala Cys Leu Thr Arg Gln Cys Leu Pro
      50              55              60              65
cct gtt tgc gta tgt gaa gat gga ttc tac aga aat gac aac gac caa 299
Pro Val Cys Val Cys Glu Asp Gly Phe Tyr Arg Asn Asp Asn Asp Gln
      70              75              80
tgt gtt gat gaa gaa gaa tgc aat atg gag ttt att act ttc gcr cca tg 349
Cys Val Asp Glu Glu Glu Cys Asn Met Glu Phe Ile Thr Phe Ala Pro
      85              90              95
aagcaaatga cagccgatgg tttggactct cgctacagat cacagcttta ctgtttccct 409

tgcatcatag tagttttgct agatagtgta tatattagca tgattttctg atagggagaa 469

taaagctttc caattttc                                         487

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<210> 35
 <211> 477
 <212> DNA
 <213> Ancylostoma caninum

<220>
 <221> CDS
 <222> (24)..(338)

<220>
 <221> MOD_RES
 <223> Recombinant cDNA Molecule AcaNAP44 sequence

<400> 35

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gaattccgcg gaattccgca acg atg aag acg ctc tat att atc gct ata tgc 53
                        Met Lys Thr Leu Tyr Ile Ile Ala Ile Cys
                        1           5           10
tcg ctc ctc att tcg ctg tgt act gga aga ccg gaa aaa aag tgc ggt 101
Ser Leu Leu Ile Ser Leu Cys Thr Gly Arg Pro Glu Lys Lys Cys Gly
                        15           20           25
ccc ggt gaa aga ctc gac tgt gcc aac aag aag cca tgc gag ccc aag 149
Pro Gly Glu Arg Leu Asp Cys Ala Asn Lys Lys Pro Cys Glu Pro Lys
                        30           35           40
tgc aaa ata gag aca agt gag gag gag gat gac gac gta gag gaa acc 197
Cys Lys Ile Glu Thr Ser Glu Glu Glu Asp Asp Asp Val Glu Glu Thr
                        45           50           55
gat gtg aga tgc ctc gta cgt gtg tgt gaa cgg cct ctt aaa tgc ata 245
Asp Val Arg Cys Leu Val Arg Val Cys Glu Arg Pro Leu Lys Cys Ile
                        60           65           70
tgc aag gat gga tac tac aga aac aag aaa ggc gaa tgt gtg act gat 293
Cys Lys Asp Gly Tyr Tyr Arg Asn Lys Lys Gly Glu Cys Val Thr Asp
                        75           80           85           90
gat gta tgc cag gaa gac ttt atg gag ttt att act ttc gca cca taaacc 344
Asp Val Cys Gln Glu Asp Phe Met Glu Phe Ile Thr Phe Ala Pro
                        95           100           105
caataatgac cactggctcc cattcttcgt gatcagcgtc ggtgggttgac agtctcccct 404

gcattcttagt tgctttgctt gataatctat acataaacag tactttctga gatagaataa 464

agctctcaac tac 477

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<210> 36
 <211> 685
 <212> DNA
 <213> Ancylostoma caninum

<220>
 <221> CDS
 <222> (14)..(556)

<220>
 <221> MOD_RES
 <223> Recombinant cDNA Molecule AcaNAP45 sequence

<400> 36

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aattccgga aaa atg ctg atg ctc tac ctt gtt cct atc tgg ttg cta      48
      Met Leu Met Leu Tyr Leu Val Pro Ile Trp Leu Leu
          1              5              10
ctc att tcg caa tgc agt gga aaa tcc gcg aag aaa tgt ggt ctc aat      96
Leu Ile Ser Gln Cys Ser Gly Lys Ser Ala Lys Lys Cys Gly Leu Asn
      15              20              25
gaa aaa ttg gac tgt ggc aat ctg aag gca tgc gag aaa aag tgc agc      144
Glu Lys Leu Asp Cys Gly Asn Leu Lys Ala Cys Glu Lys Lys Cys Ser
      30              35              40
gac ttg gac aat gag gag gat tat aag gag gaa gat gag tcg aaa tgc      192
Asp Leu Asp Asn Glu Glu Asp Tyr Lys Glu Glu Asp Glu Ser Lys Cys
      45              50              55              60
cga tca cgt gaa tgt agt cgt cgt gtt tgt gta tgc gat gaa gga ttc      240
Arg Ser Arg Glu Cys Ser Arg Arg Val Cys Val Cys Asp Glu Gly Phe
          65              70              75
tac aga aac aag aag ggc caa tgt gtg aca aga gat gat tgc gag tat      288
Tyr Arg Asn Lys Lys Gly Gln Cys Val Thr Arg Asp Asp Cys Glu Tyr
          80              85              90
gac aat atg gag att atc act ttt cca cca gaa gat aaa tgt ggt ccc      336
Asp Asn Met Glu Ile Ile Thr Phe Pro Pro Glu Asp Lys Cys Gly Pro
          95              100              105
gat gaa tgg ttc gac tgg tgt gga act tac aag cag tgt gag cgc aag      384
Asp Glu Trp Phe Asp Trp Cys Gly Thr Tyr Lys Gln Cys Glu Arg Lys
          110              115              120
tgc aat aag gag cta agt gag aaa gat gaa gag gca tgc ctc tca cgt      432
Cys Asn Lys Glu Leu Ser Glu Lys Asp Glu Glu Ala Cys Leu Ser Arg
          125              130              135              140
gct tgt act ggt cgt gct tgt gtt tgc aac gac gga ctg tac aga gac      480
Ala Cys Thr Gly Arg Ala Cys Val Cys Asn Asp Gly Leu Tyr Arg Asp
          145              150              155
gat ttt ggc aat tgt gtt gag aaa gac gaa tgt aac gat atg gag att      528
Asp Phe Gly Asn Cys Val Glu Lys Asp Glu Cys Asn Asp Met Glu Ile
          160              165              170
atc act ttt cca ccg gaa acc aaa cac tgaccaaagg ctctaactct cgctacat 583
Ile Thr Phe Pro Pro Glu Thr Lys His
          175              180
aacgtcagtg cttgaattgc ccctttacga gttagtaatt ttgactaact ctgtgtaatt 643
gagcattgtc tactgatggg gaaaatgaag tgttcaatgt ct      685

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<210> 37
 <211> 707
 <212> DNA
 <213> Ancylostoma caninum

<220>
 <221> CDS
 <222> (34)..(576)

<220>
 <221> MOD_RES
 <223> Recombinant cDNA Molecule AcaNAP47 sequence

<400> 37

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gaattccgcg gaattccggt tggcggcaga aaa atg ctg atg ctc tac ctt gtt 54
                                Met Leu Met Leu Tyr Leu Val
                                1           5
cct atc tgg ttc ctg ctc att tcg caa tgc agt gga aaa tcc gcg aag 102
Pro Ile Trp Phe Leu Leu Ile Ser Gln Cys Ser Gly Lys Ser Ala Lys
      10           15           20
aaa tgt ggc ctc aat gaa aaa ttg gac tgt ggc aat ctg aag gca tgc 150
Lys Cys Gly Leu Asn Glu Lys Leu Asp Cys Gly Asn Leu Lys Ala Cys
      25           30           35
gag aaa aag tgc agc gac ttg gac aat gag gag gat tat ggg gag gaa 198
Glu Lys Lys Cys Ser Asp Leu Asp Asn Glu Glu Asp Tyr Gly Glu Glu
40           45           50           55
gat gag tcg aaa tgc cga tca cgt gaa tgt att ggt cgt gtt tgc gta 246
Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys Ile Gly Arg Val Cys Val
      60           65           70
tgc gat gaa gga ttc tac aga aac aag aag ggc caa tgt gtg aca aga 294
Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys Gly Gln Cys Val Thr Arg
      75           80           85
gac gat tgc gag tat gac aat atg gag att atc act ttt cca cca gaa 342
Asp Asp Cys Glu Tyr Asp Asn Met Glu Ile Ile Thr Phe Pro Pro Glu
      90           95          100
gat aaa tgt ggt ccc gat gaa tgg ttc gac tgg tgt gga act tac aag 390
Asp Lys Cys Gly Pro Asp Glu Trp Phe Asp Trp Cys Gly Thr Tyr Lys
     105          110          115
cag tgt gag cgc aag tgc agt gag gag cta agt gag aaa aat gag gag 438
Gln Cys Glu Arg Lys Cys Ser Glu Glu Leu Ser Glu Lys Asn Glu Glu
     120          125          130          135
gca tgc ctc tca cgt gct tgt act ggt cgt gct tgc gtt tgc aac gac 486
Ala Cys Leu Ser Arg Ala Cys Thr Gly Arg Ala Cys Val Cys Asn Asp
           140          145          150
gga ttg tat aga gac gat ttt ggc aat tgt gtt gag aaa gac gaa tgt 534
Gly Leu Tyr Arg Asp Asp Phe Gly Asn Cys Val Glu Lys Asp Glu Cys
           155          160          165
aac gat atg gag att atc act ttt cca ccg gaa acc aaa cac tgaccaaagg 586
Asn Asp Met Glu Ile Ile Thr Phe Pro Pro Glu Thr Lys His
     170          175          180

```

ctctagctct cgctacataa cgtcagtgt tgaattgtcc ctttacgtgt tagtaatttt 646
gactaactct gtgtatttga gcattgtcta ctaatggtga aaatgaagct tttcaatgac 706
t 707

<210> 38
<211> 529
<212> DNA
<213> Ancylostoma caninum

<220>
<221> CDS
<222> (31)..(309)

<220>
<221> MOD_RES
<223> Recombinant cDNA Molecule AcaNAP48 sequence

<400> 38

gaattccgta cgacctacta ctactcaacg atg aag gcg ctc tat gtt atc tct 54
Met Lys Ala Leu Tyr Val Ile Ser
1 5
ata acg ttg ctc ctg gta tgg caa tgc agt gca aga aca gcg agg aaa 102
Ile Thr Leu Leu Leu Val Trp Gln Cys Ser Ala Arg Thr Ala Arg Lys
10 15 20
ccc cca acg tgt ggt gaa aat gaa agg gtc gaa tgg tgt ggc aag cag 150
Pro Pro Thr Cys Gly Glu Asn Glu Arg Val Glu Trp Cys Gly Lys Gln
25 30 35 40
tgc gag atc aca tgt gac gac cca gat aag ata tgc cgc tca ctc gct 198
Cys Glu Ile Thr Cys Asp Asp Pro Asp Lys Ile Cys Arg Ser Leu Ala
45 50 55
tgt cct ggt cct cct gct tgc gta tgc gac gac gga tac tac aga gac 246
Cys Pro Gly Pro Pro Ala Cys Val Cys Asp Asp Gly Tyr Tyr Arg Asp
60 65 70
acg aac gtt ggc ttg tgt gta caa tat gac gaa tgc aac gat atg gat 294
Thr Asn Val Gly Leu Cys Val Gln Tyr Asp Glu Cys Asn Asp Met Asp
75 80 85
att att atg gtt tca taggggtgac tgaagaatcg aacaaccggt gcacaacttc 349
Ile Ile Met Val Ser
90
tatgcttgac tatctctctt gcatcatgca agtttagcta gatagtgtat atattagcaa 409
gaccccttgg ggagaatgaa gcttcccaac tatattaaat caataacggt ttcgcttcat 469
gtacacgtgc tcagcacatt catatccact cctcacactc catgaaagca gtgaaatggt 529

<210> 39
 <211> 361
 <212> DNA
 <213> Necator americanus

<220>
 <221> CDS
 <222> (16)..(252)

<220>
 <221> MOD_RES
 <223> Recombinant cDNA Molecule NamNAP sequence

<400> 39

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gccaaactctt cgaac atg att cga ggc ctc gtt ctt ctt tct ctc ctg ttt 51
              Met Ile Arg Gly Leu Val Leu Leu Ser Leu Leu Phe
              1               5               10
tgc gtc act ttt gca gcg aag aga gat tgt cca gca aat gag gaa tgg 99
Cys Val Thr Phe Ala Ala Lys Arg Asp Cys Pro Ala Asn Glu Glu Trp
              15               20               25
agg gaa tgt ggc act cca tgt gaa cca aaa tgc aat caa ccg atg cca 147
Arg Glu Cys Gly Thr Pro Cys Glu Pro Lys Cys Asn Gln Pro Met Pro
              30               35               40
gat ata tgt act atg aat tgt atc gtc gat gtg tgt caa tgc aag gag 195
Asp Ile Cys Thr Met Asn Cys Ile Val Asp Val Cys Gln Cys Lys Glu
45               50               55               60
gga tac aag cgt cat gaa acg aag gga tgc tta aag gaa gga tca gct 243
Gly Tyr Lys Arg His Glu Thr Lys Gly Cys Leu Lys Glu Gly Ser Ala
              65               70               75
gat tgt aaa taagttatca gaacgctcgt tttgtcttac attagatggg tgagctgatg 302
Asp Cys Lys

```

tatctgtcag ataaactctt tcttctaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 361

<210> 40
 <211> 77
 <212> PRT
 <213> Ancylostoma caninum

<400> 40

```

Lys Ala Tyr Pro Glu Cys Gly Glu Asn Glu Trp Leu Asp Asp Cys Gly
 1               5               10               15
Thr Gln Lys Pro Cys Glu Ala Lys Cys Asn Glu Glu Pro Pro Glu Glu
              20               25               30
Glu Asp Pro Ile Cys Arg Ser Arg Gly Cys Leu Leu Pro Pro Ala Cys
              35               40               45
Val Cys Lys Asp Gly Phe Tyr Arg Asp Thr Val Ile Gly Asp Cys Val
              50               55               60
Arg Glu Glu Glu Cys Asp Gln His Glu Ile Ile His Val
65               70               75

```

<210> 41
 <211> 75
 <212> PRT
 <213> Ancylostoma caninum

<400> 41

Lys	Ala	Tyr	Pro	Glu	Cys	Gly	Glu	Asn	Glu	Trp	Leu	Asp	Val	Cys	Gly
1				5				10						15	
Thr	Lys	Lys	Pro	Cys	Glu	Ala	Lys	Cys	Ser	Glu	Glu	Glu	Glu	Glu	Asp
			20					25						30	
Pro	Ile	Cys	Arg	Ser	Phe	Ser	Cys	Pro	Gly	Pro	Ala	Ala	Cys	Val	Cys
		35					40					45			
Glu	Asp	Gly	Phe	Tyr	Arg	Asp	Thr	Val	Ile	Gly	Asp	Cys	Val	Lys	Glu
	50					55					60				
Glu	Glu	Cys	Asp	Gln	His	Glu	Ile	Ile	His	Val					
65					70				75						

<210> 42
 <211> 74
 <212> PRT
 <213> Ancylostoma caninum

<400> 42

Arg	Thr	Ala	Arg	Lys	Pro	Pro	Thr	Cys	Gly	Glu	Asn	Glu	Arg	Val	Glu
1				5					10					15	
Trp	Cys	Gly	Lys	Gln	Cys	Glu	Ile	Thr	Cys	Asp	Asp	Pro	Asp	Lys	Ile
			20					25						30	
Cys	Arg	Ser	Leu	Ala	Cys	Pro	Gly	Pro	Pro	Ala	Cys	Val	Cys	Asp	Asp
		35					40					45			
Gly	Tyr	Tyr	Arg	Asp	Thr	Asn	Val	Gly	Leu	Cys	Val	Gln	Tyr	Asp	Glu
	50					55					60				
Cys	Asn	Asp	Met	Asp	Ile	Ile	Met	Val	Ser						
65					70										

<210> 43
 <211> 88
 <212> PRT
 <213> Ancylostoma caninum

<400> 43

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Lys Pro Ser Glu Lys Glu Cys Gly Pro His Glu Arg Leu Asp Cys Gly
1          5          10          15
Asn Lys Lys Pro Cys Glu Arg Lys Cys Lys Ile Glu Thr Ser Glu Glu
      20          25          30
Glu Asp Asp Tyr Glu Glu Gly Thr Glu Arg Phe Arg Cys Leu Leu Arg
      35          40          45
Val Cys Asp Gln Pro Tyr Glu Cys Ile Cys Asp Asp Gly Tyr Tyr Arg
      50          55          60
Asn Lys Lys Gly Glu Cys Val Thr Asp Asp Val Cys Gln Glu Asp Phe
65          70          75          80
Met Glu Phe Ile Thr Phe Ala Pro
      85

```

<210> 44
 <211> 87
 <212> PRT
 <213> Ancylostoma caninum

<400> 44

```

Arg Pro Glu Lys Lys Cys Gly Pro Gly Glu Arg Leu Ala Cys Gly Asn
1          5          10          15
Lys Lys Pro Cys Glu Arg Lys Cys Lys Ile Glu Thr Ser Glu Glu Glu
      20          25          30
Asp Asp Tyr Pro Glu Gly Thr Glu Arg Phe Arg Cys Leu Leu Arg Val
      35          40          45
Cys Asp Gln Pro Tyr Glu Cys Ile Cys Asp Asp Gly Tyr Tyr Arg Asn
      50          55          60
Lys Lys Gly Glu Cys Val Thr Asp Asp Val Cys Gln Glu Asp Phe Met
65          70          75          80
Glu Phe Ile Thr Phe Ala Pro
      85

```

<210> 45
 <211> 86
 <212> PRT
 <213> Ancylostoma caninum

<400> 45

Arg	Pro	Glu	Lys	Lys	Cys	Gly	Pro	Gly	Glu	Arg	Leu	Asp	Cys	Ala	Asn
1				5					10					15	
Lys	Lys	Pro	Cys	Glu	Pro	Lys	Cys	Lys	Ile	Glu	Thr	Ser	Glu	Glu	Glu
		20						25					30		
Asp	Asp	Asp	Val	Glu	Asp	Thr	Asp	Val	Arg	Cys	Leu	Val	Arg	Val	Cys
		35					40					45			
Glu	Arg	Pro	Leu	Lys	Cys	Ile	Cys	Lys	Asp	Gly	Tyr	Tyr	Arg	Asn	Lys
	50					55					60				
Lys	Gly	Glu	Cys	Val	Thr	Asp	Asp	Val	Cys	Gln	Glu	Asp	Phe	Met	Glu
65					70					75					80
Phe	Ile	Thr	Phe	Ala	Pro										
					85										

<210> 46
 <211> 86
 <212> PRT
 <213> Ancylostoma caninum

<400> 46

Arg	Pro	Glu	Lys	Lys	Cys	Gly	Pro	Gly	Glu	Arg	Leu	Asp	Cys	Ala	Asn
1				5					10					15	
Lys	Lys	Pro	Cys	Glu	Pro	Lys	Cys	Lys	Ile	Glu	Thr	Ser	Glu	Glu	Glu
		20						25					30		
Asp	Asp	Asp	Val	Glu	Glu	Thr	Asp	Val	Arg	Cys	Leu	Val	Arg	Val	Cys
		35					40					45			
Glu	Arg	Pro	Leu	Lys	Cys	Ile	Cys	Lys	Asp	Gly	Tyr	Tyr	Arg	Asn	Lys
	50					55					60				
Lys	Gly	Glu	Cys	Val	Thr	Asp	Asp	Val	Cys	Gln	Glu	Asp	Phe	Met	Glu
65					70					75					80
Phe	Ile	Thr	Phe	Ala	Pro										
					85										

<210> 47
 <211> 78
 <212> PRT
 <213> Ancylostoma caninum

<400> 47

Lys	Ser	Leu	Trp	Asp	Gln	Lys	Cys	Gly	Glu	Asn	Glu	Arg	Leu	Asp	Cys
1				5					10					15	
Gly	Asn	Gln	Lys	Asp	Cys	Glu	Arg	Lys	Cys	Asp	Asp	Lys	Arg	Ser	Glu
			20					25					30		
Glu	Glu	Ile	Met	Gln	Ala	Cys	Leu	Thr	Arg	Gln	Cys	Leu	Pro	Pro	Val
		35					40					45			
Cys	Val	Cys	Glu	Asp	Gly	Phe	Tyr	Arg	Asn	Asp	Asn	Asp	Gln	Cys	Val
	50					55					60				
Asp	Glu	Glu	Glu	Cys	Asn	Met	Glu	Phe	Ile	Thr	Phe	Ala	Pro		
65					70					75					

<210> 48
 <211> 89
 <212> PRT
 <213> Ancylostoma ceylanicum

<400> 48

Lys	Pro	Asn	Asn	Val	Met	Thr	Asn	Ala	Cys	Gly	Leu	Asn	Glu	Tyr	Phe
1				5					10					15	
Ala	Glu	Cys	Gly	Asn	Met	Lys	Glu	Cys	Glu	His	Arg	Cys	Asn	Glu	Glu
			20					25					30		
Glu	Asn	Glu	Glu	Arg	Asp	Glu	Glu	Arg	Ile	Thr	Ala	Cys	Leu	Ile	Arg
		35					40					45			
Val	Cys	Phe	Arg	Pro	Gly	Ala	Cys	Val	Cys	Lys	Asp	Gly	Phe	Tyr	Arg
	50					55					60				
Asn	Arg	Thr	Gly	Ser	Cys	Val	Glu	Glu	Asp	Asp	Cys	Glu	Tyr	Glu	Asn
65					70					75					80
Met	Glu	Phe	Ile	Thr	Phe	Ala	Pro	Glu							
					85										

<210> 49
 <211> 82
 <212> PRT
 <213> Ancylostoma ceylanicum

<400> 49

```

Val Pro Ile Cys Gly Ser Asn Glu Arg Tyr Ser Asp Cys Gly Asn Asp
1          5          10          15
Lys Gln Cys Glu Arg Lys Cys Asn Glu Asp Asp Tyr Glu Lys Gly Asp
          20          25          30
Glu Ala Cys Arg Ser His Val Cys Glu Arg Pro Gly Ala Cys Val Cys
          35          40          45
Glu Asp Gly Phe Tyr Arg Asn Lys Lys Gly Ser Cys Val Glu Ser Asp
          50          55          60
Asp Cys Glu Tyr Asp Asn Met Asp Phe Ile Thr Phe Ala Pro Glu Thr
65          70          75          80
Ser Arg

```

<210> 50
 <211> 84
 <212> PRT
 <213> Ancylostoma caninum

<400> 50

```

Lys Ser Ala Lys Lys Cys Gly Leu Asn Glu Lys Leu Asp Cys Gly Asn
1          5          10          15
Leu Lys Ala Cys Glu Lys Lys Cys Ser Asp Leu Asp Asn Glu Glu Asp
          20          25          30
Tyr Lys Glu Glu Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys Ser Arg
          35          40          45
Arg Val Cys Val Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys Gly Gln
          50          55          60
Cys Val Thr Arg Asp Asp Cys Glu Tyr Asp Asn Met Glu Ile Ile Thr
65          70          75          80
Phe Pro Pro Glu

```

<210> 51
 <211> 84
 <212> PRT
 <213> Ancylostoma caninum

<400> 51

```

Lys Ser Ala Lys Lys Cys Gly Leu Asn Glu Lys Leu Asp Cys Gly Asn
1          5          10          15
Leu Lys Ala Cys Glu Lys Lys Cys Ser Asp Leu Asp Asn Glu Glu Asp
          20          25          30
Tyr Gly Glu Glu Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys Ile Gly
          35          40          45
Arg Val Cys Val Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys Gly Gln
          50          55          60
Cys Val Thr Arg Asp Asp Cys Glu Tyr Asp Asn Met Glu Ile Ile Thr
65          70          75          80
Phe Pro Pro Glu

```

<210> 52
 <211> 83
 <212> PRT
 <213> Ancylostoma duodenale

<400> 52

```

Lys Ala Ala Lys Lys Cys Gly Leu Asn Glu Arg Leu Asp Cys Gly Asn
1          5          10          15
Leu Lys Gln Cys Glu Pro Lys Cys Ser Asp Leu Glu Ser Glu Glu Tyr
          20          25          30
Glu Glu Glu Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys Ser Arg Arg
          35          40          45
Val Cys Val Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys Gly Lys Cys
          50          55          60
Val Ala Lys Asp Val Cys Glu Asp Asp Asn Met Glu Ile Ile Thr Phe
65          70          75          80
Pro Pro Glu

```

<210> 53
 <211> 78
 <212> PRT
 <213> Ancylostoma caninum

<400> 53

Asp	Lys	Cys	Gly	Pro	Asp	Glu	Trp	Phe	Asp	Trp	Cys	Gly	Thr	Tyr	Lys
1				5				10						15	
Gln	Cys	Glu	Arg	Lys	Cys	Asn	Lys	Glu	Leu	Ser	Glu	Lys	Asp	Glu	Glu
			20					25					30		
Ala	Cys	Leu	Ser	Arg	Ala	Cys	Thr	Gly	Arg	Ala	Cys	Val	Cys	Asn	Asp
		35					40					45			
Gly	Leu	Tyr	Arg	Asp	Asp	Phe	Gly	Asn	Cys	Val	Glu	Lys	Asp	Glu	Cys
	50					55					60				
Asn	Asp	Met	Glu	Ile	Ile	Thr	Phe	Pro	Pro	Glu	Thr	Lys	His		
65					70					75					

<210> 54
 <211> 78
 <212> PRT
 <213> Ancylostoma caninum

<400> 54

Asp	Lys	Cys	Gly	Pro	Asp	Glu	Trp	Phe	Asp	Trp	Cys	Gly	Thr	Tyr	Lys
1				5				10						15	
Gln	Cys	Glu	Arg	Lys	Cys	Ser	Glu	Glu	Leu	Ser	Glu	Lys	Asn	Glu	Glu
			20					25					30		
Ala	Cys	Leu	Ser	Arg	Ala	Cys	Thr	Gly	Arg	Ala	Cys	Val	Cys	Asn	Asp
		35					40					45			
Gly	Leu	Tyr	Arg	Asp	Asp	Phe	Gly	Asn	Cys	Val	Glu	Lys	Asp	Glu	Cys
	50					55					60				
Asn	Asp	Met	Glu	Ile	Ile	Thr	Phe	Pro	Pro	Glu	Thr	Lys	His		
65					70					75					

<210> 55
 <211> 77
 <212> PRT
 <213> Ancylostoma duodenale

<400> 55

Lys	Cys	Pro	Thr	Asp	Glu	Trp	Phe	Asp	Trp	Cys	Gly	Thr	Tyr	Lys	His
1				5					10					15	
Cys	Glu	Leu	Lys	Cys	Asp	Arg	Glu	Leu	Thr	Glu	Lys	Glu	Glu	Gln	Ala
			20					25						30	
Cys	Leu	Ser	Arg	Val	Cys	Glu	Lys	Ser	Ala	Cys	Val	Cys	Asn	Asp	Gly
			35					40						45	
Leu	Tyr	Arg	Asp	Lys	Phe	Gly	Asn	Cys	Val	Glu	Lys	Asp	Glu	Cys	Asn
	50					55						60			
Asp	Met	Glu	Ile	Ile	Thr	Phe	Ala	Pro	Glu	Glu	Thr	Lys			
65					70						75				

<210> 56
 <211> 78
 <212> PRT
 <213> Ancylostoma duodenale

<400> 56

Asp	Glu	Cys	Gly	Pro	Asp	Glu	Trp	Phe	Asp	Tyr	Cys	Gly	Asn	Tyr	Lys
1				5					10					15	
Lys	Cys	Glu	Arg	Lys	Cys	Ser	Glu	Glu	Thr	Ser	Glu	Lys	Asn	Glu	Glu
			20					25						30	
Ala	Cys	Leu	Ser	Arg	Ala	Cys	Thr	Gly	Arg	Ala	Cys	Val	Cys	Lys	Asp
			35					40						45	
Gly	Leu	Tyr	Arg	Asp	Asp	Phe	Gly	Asn	Cys	Val	Pro	His	Asp	Glu	Cys
	50					55					60				
Asn	Asp	Met	Glu	Ile	Ile	Thr	Phe	Pro	Pro	Glu	Thr	Lys	His		
65					70						75				

<210> 57
 <211> 75
 <212> PRT
 <213> Ancylostoma ceylanicum

<400> 57

Lys	Ala	Phe	Pro	Lys	Cys	Asp	Val	Asn	Glu	Arg	Phe	Glu	Val	Cys	Gly
1				5					10					15	
Asn	Leu	Lys	Glu	Cys	Glu	Leu	Lys	Cys	Asp	Glu	Asp	Pro	Lys	Ile	Cys
			20					25					30		
Ser	Arg	Ala	Cys	Ile	Arg	Pro	Pro	Ala	Cys	Val	Cys	Asp	Asp	Gly	Phe
		35					40					45			
Tyr	Arg	Asp	Lys	Tyr	Gly	Phe	Cys	Val	Glu	Glu	Asp	Glu	Cys	Asn	Asp
	50					55					60				
Met	Glu	Ile	Ile	Thr	Phe	Pro	Pro	Glu	Thr	Lys					
65					70					75					

<210> 58
 <211> 77
 <212> PRT
 <213> Ancylostoma ceylanicum

<400> 58

Arg	Thr	Val	Lys	Lys	Cys	Gly	Lys	Asn	Glu	Arg	Tyr	Asp	Asp	Cys	Gly
1				5					10					15	
Asn	Ala	Lys	Asp	Cys	Glu	Thr	Lys	Cys	Gly	Glu	Glu	Glu	Lys	Val	Cys
			20					25					30		
Arg	Ser	Arg	Glu	Cys	Thr	Ser	Pro	Gly	Ala	Cys	Val	Cys	Glu	Gln	Gly
		35					40					45			
Phe	Tyr	Arg	Asp	Pro	Ala	Gly	Asp	Cys	Val	Thr	Asp	Glu	Glu	Cys	Asp
	50					55					60				
Glu	Trp	Asn	Asn	Met	Glu	Ile	Ile	Thr	Met	Pro	Lys	Gln			
65					70					75					

<210> 59
 <211> 84
 <212> PRT
 <213> Ancylostoma caninum

<400> 59

```

Lys Ala Thr Met Gln Cys Gly Glu Asn Glu Lys Tyr Asp Ser Cys Gly
1          5          10          15
Ser Lys Glu Cys Asp Lys Lys Cys Lys Tyr Asp Gly Val Glu Glu Glu
          20          25          30
Asp Asp Glu Glu Pro Asn Val Pro Cys Leu Val Arg Val Cys His Gln
          35          40          45
Asp Cys Val Cys Glu Glu Gly Phe Tyr Arg Asn Lys Asp Asp Lys Cys
          50          55          60
Val Ser Ala Glu Asp Cys Glu Leu Asp Asn Met Asp Phe Ile Tyr Pro
65          70          75          80
Gly Thr Arg Asn

```

<210> 60
 <211> 58
 <212> PRT
 <213> Heligmosomoides polygyrus

<400> 60

```

Lys Thr Cys Gly Pro Asn Glu Glu Tyr Thr Glu Cys Gly Thr Pro Cys
1          5          10          15
Glu Pro Lys Cys Asn Glu Pro Met Pro Asp Ile Cys Thr Leu Asn Cys
          20          25          30
Ile Val Asn Val Cys Gln Cys Lys Pro Gly Phe Lys Arg Gly Pro Lys
          35          40          45
Gly Cys Val Ala Pro Gly Pro Gly Cys Lys
          50          55

```

<210> 61
 <211> 61
 <212> PRT
 <213> Necator americanus

<400> 61

```

Lys Arg Asp Cys Pro Ala Asn Glu Glu Trp Arg Glu Cys Gly Thr Pro
1          5          10          15
Cys Glu Pro Lys Cys Asn Gln Pro Met Pro Asp Ile Cys Thr Met Asn
          20          25          30
Cys Ile Val Asp Val Cys Gln Cys Lys Glu Gly Tyr Lys Arg His Glu
          35          40          45
Thr Lys Gly Cys Leu Lys Glu Gly Ser Ala Asp Cys Lys
          50          55          60

```

<210> 62
 <211> 171
 <212> PRT
 <213> Ancylostoma ceylanicum

<400> 62

```

Lys Pro Asn Asn Val Met Thr Asn Ala Cys Gly Leu Asn Glu Tyr Phe
1          5          10          15
Ala Glu Cys Gly Asn Met Lys Glu Cys Glu His Arg Cys Asn Glu Glu
          20          25          30
Glu Asn Glu Glu Arg Asp Glu Glu Arg Ile Thr Ala Cys Leu Ile Arg
          35          40          45
Val Cys Phe Arg Pro Gly Ala Cys Val Cys Lys Asp Gly Phe Tyr Arg
          50          55          60
Asn Arg Thr Gly Ser Cys Val Glu Glu Asp Asp Cys Glu Tyr Glu Asn
65          70          75          80
Met Glu Phe Ile Thr Phe Ala Pro Glu Val Pro Ile Cys Gly Ser Asn
          85          90          95
Glu Arg Tyr Ser Asp Cys Gly Asn Asp Lys Gln Cys Glu Arg Lys Cys
          100          105          110
Asn Glu Asp Asp Tyr Glu Lys Gly Asp Glu Ala Cys Arg Ser His Val
          115          120          125
Cys Glu Arg Pro Gly Ala Cys Val Cys Glu Asp Gly Phe Tyr Arg Asn
          130          135          140
Lys Lys Gly Ser Cys Val Glu Ser Asp Asp Cys Glu Tyr Asp Asn Met
145          150          155          160
Asp Phe Ile Thr Phe Ala Pro Glu Thr Ser Arg
          165          170

```

<210> 63
 <211> 162
 <212> PRT
 <213> Ancylostoma caninum

<400> 63

```

Lys Ser Ala Lys Lys Cys Gly Leu Asn Glu Lys Leu Asp Cys Gly Asn
1          5          10          15
Leu Lys Ala Cys Glu Lys Lys Cys Ser Asp Leu Asp Asn Glu Glu Asp
          20          25          30
Tyr Lys Glu Glu Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys Ser Arg
          35          40          45
Arg Val Cys Val Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys Gly Gln
          50          55          60
Cys Val Thr Arg Asp Asp Cys Glu Tyr Asp Asn Met Glu Ile Ile Thr
65          70          75          80
Phe Pro Pro Glu Asp Lys Cys Gly Pro Asp Glu Trp Phe Asp Trp Cys
          85          90          95
Gly Thr Tyr Lys Gln Cys Glu Arg Lys Cys Asn Lys Glu Leu Ser Glu
          100          105          110

```

Lys Asp Glu Glu Ala Cys Leu Ser Arg Ala Cys Thr Gly Arg Ala Cys
 115 120 125
 Val Cys Asn Asp Gly Leu Tyr Arg Asp Asp Phe Gly Asn Cys Val Glu
 130 135 140
 Lys Asp Glu Cys Asn Asp Met Glu Ile Ile Thr Phe Pro Pro Glu Thr
 145 150 155 160
 Lys His

<210> 64
 <211> 162
 <212> PRT
 <213> Ancylostoma caninum

<400> 64

Lys Ser Ala Lys Lys Cys Gly Leu Asn Glu Lys Leu Asp Cys Gly Asn
 1 5 10 15
 Leu Lys Ala Cys Glu Lys Lys Cys Ser Asp Leu Asp Asn Glu Glu Asp
 20 25 30
 Tyr Gly Glu Glu Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys Ile Gly
 35 40 45
 Arg Val Cys Val Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys Gly Gln
 50 55 60
 Cys Val Thr Arg Asp Asp Cys Glu Tyr Asp Asn Met Glu Ile Ile Thr
 65 70 75 80
 Phe Pro Pro Glu Asp Lys Cys Gly Pro Asp Glu Trp Phe Asp Trp Cys
 85 90 95
 Gly Thr Tyr Lys Lys Cys Glu Arg Lys Cys Ser Glu Glu Leu Ser Glu
 100 105 110
 Lys Asn Glu Glu Ala Cys Leu Ser Arg Ala Cys Thr Gly Arg Ala Cys
 115 120 125
 Val Cys Asn Asp Gly Leu Tyr Arg Asp Asp Phe Gly Asn Cys Val Glu
 130 135 140
 Lys Asp Glu Cys Asn Asp Met Glu Ile Ile Thr Phe Pro Pro Glu Thr
 145 150 155 160
 Lys His

<210> 65
 <211> 161
 <212> PRT
 <213> Ancylostoma duodenale

<400> 65

Lys Ala Ala Lys Lys Cys Gly Leu Asn Glu Arg Leu Asp Cys Gly Asn
 1 5 10 15
 Leu Lys Gln Cys Glu Pro Lys Cys Ser Asp Leu Glu Ser Glu Glu Tyr
 20 25 30
 Glu Glu Glu Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys Ser Arg Arg
 35 40 45
 Val Cys Val Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys Gly Lys Cys
 50 55 60

Val	Ala	Lys	Asp	Val	Cys	Glu	Asp	Asp	Asn	Met	Glu	Ile	Ile	Thr	Phe
65					70				75						80
Pro	Pro	Glu	Asp	Glu	Cys	Gly	Pro	Asp	Glu	Trp	Phe	Asp	Tyr	Cys	Gly
				85					90					95	
Asn	Tyr	Lys	Lys	Cys	Glu	Arg	Lys	Cys	Ser	Glu	Glu	Thr	Ser	Glu	Lys
			100					105					110		
Asn	Glu	Glu	Ala	Cys	Leu	Ser	Arg	Ala	Cys	Thr	Gly	Arg	Ala	Cys	Val
		115					120					125			
Cys	Lys	Asp	Gly	Leu	Tyr	Arg	Asp	Asp	Phe	Gly	Asn	Cys	Val	Pro	His
	130					135					140				
Asp	Glu	Cys	Asn	Asp	Met	Glu	Ile	Ile	Thr	Phe	Pro	Pro	Glu	Thr	Lys
145				150					155					160	
His															

<210> 66
 <211> 9
 <212> PRT
 <213> Ancylostoma caninum

<220>
 <221> MISC_FEATURE
 <222> (2)
 <223> Xaa is any amino acid

<220>
 <221> MISC_FEATURE
 <222> (3)
 <223> Xaa is any amino acid

<220>
 <221> MISC_FEATURE
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Asp Ile Ile Met Val
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Phe Ile Thr Phe Ala Pro
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<210> 89
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<223> "y" stands for c or t

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21

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Lys Ala Tyr Pro Glu Cys Gly Glu Asn Glu Trp Leu Asp
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<210> 93
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<400> 93

Lys Ala Tyr Pro Glu Cys Gly Glu Asn Glu Trp
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33

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28

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Gln	Lys	Pro														
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ttcgct 66

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Lys Ala Tyr Pro Glu
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gtgggagacc tgatactctc aag 23

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Arg Thr Val Arg Lys Ala Tyr Pro Glu
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Arg Thr Val Arg Lys
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44

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			20					25					30		
Tyr	Asp	Gly	Val	Glu	Glu	Glu	Asp	Asp	Glu	Glu	Pro	Asn	Val	Pro	Cys
		35					40					45			
Leu	Val	Arg	Val	Cys	His	Gln	Asp	Cys	Val	Cys	Glu	Glu	Gly	Phe	Tyr
	50					55					60				
Arg	Asn	Lys	Asp	Asp	Lys	Cys	Val	Ser	Ala	Glu	Asp	Cys	Glu	Leu	Asp
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Asn	Met	Asp	Phe	Ile	Tyr	Pro	Gly	Thr	Arg	Asn					
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Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa
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Xaa Xaa

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Xaa

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<400> 217

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<400> 218

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<400> 219

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Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
20 25

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Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
20 25

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Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa Xaa Xaa
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<400> 238

Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa Xaa Xaa Xaa
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<210> 239
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1				5					10						15	

Xaa	Xaa	Xaa	Xaa	
				20

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1 5 10 15

Xaa Xaa Xaa

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1 5 10 15

Xaa Xaa

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Xaa

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Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa Xaa
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<400> 261

Xaa	Xaa	Xaa	Cys	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
1				5					10					15	

Xaa	Xaa	Xaa	Xaa
			20

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Xaa	Xaa	Xaa
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Xaa

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Cys Xaa Xaa Xaa
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Cys	Xaa	Cys	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
1			5					10							15

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<400> 278

Cys	Xaa	Cys	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
1			5					10							

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<400> 279

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1 5 10

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1 5

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1 5

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Cys Xaa Xaa Xaa Xaa Xaa
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<223> Xaa is any amino acid

<400> 283

Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
20 25

<210> 284
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<400> 284

Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
20 25

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<400> 285

Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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<400> 286

Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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<210> 287
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<400> 287

Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa
20

<210> 288
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<400> 288

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1 5 10 15

Xaa Xaa Xaa Xaa Xaa
20

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1 5 10 15

Xaa Xaa Xaa Xaa
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1 5 10 15

Xaa Xaa Xaa

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Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa

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<212> PRT
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Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa

<210> 293
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<400> 293

Cys	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
1				5					10						15	

<210> 294
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<400> 294

Cys	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
1				5					10						15	

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Cys	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
1				5					10							

<210> 296
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1 5 10

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Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

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Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

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Cys Xaa Xaa Xaa Xaa Xaa
1 5

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<400> 304

Cys Xaa Xaa Xaa Xaa
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<400> 306

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 1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa
20

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1 5 10 15

Xaa Xaa Xaa Xaa Xaa
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1 5 10 15

Xaa Xaa Xaa Xaa
20

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1 5 10 15

Xaa Xaa Xaa

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Xaa	Xaa	Xaa	Cys	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
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Xaa Xaa

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<400> 318

Xaa	Xaa	Xaa	Cys	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
1				5					10					15	

Xaa

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Xaa	Xaa	Xaa	Cys	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
1				5					10						15	

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<400> 320

Xaa	Xaa	Xaa	Cys	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
1				5					10						15	

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<400> 321

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1 5 10

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<400> 322

Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 323
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<400> 323

Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 324
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<400> 324

Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 325
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<400> 326

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<400> 328

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<400> 334

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Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
20 25

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1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
20 25

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Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
20

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Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa
20

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Xaa Xaa Xaa Xaa Xaa Xaa
20

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1 5 10 15

Xaa Xaa Xaa Xaa Xaa
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1 5 10 15

Xaa Xaa Xaa Xaa
20

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<400> 343

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Xaa Xaa Xaa

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1 5 10 15

Xaa Xaa

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1 5 10 15

Xaa

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1 5 10 15

<210> 347
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1 5 10 15

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<400> 348

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1 5 10

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<400> 349

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<400> 350

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<400> 351

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<400> 352

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Leu Xaa Arg Xaa
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